

CLAIMS

What is claimed is:

1. A metal-core weld wire for gas shielded welding, comprising:  
a low carbon steel sheath having a carbon content of not more than approximately 0.008 % C;  
a metal-core composition that is between approximately 16 % and approximately 20 % of a total weight of the metal-core weld wire,  
whereby the metal-core weld wire has a relatively reduced fume generation rate.
2. The metal-core weld wire of Claim 1, the steel sheath comprises between approximately 0.003 % C and approximately 0.004 % C.
3. The metal-core weld wire of Claim 1, the total weight of the metal-core weld wire comprises between approximately 0.005 % C and approximately 0.013 % C.
4. The metal-core weld wire of Claim 1, the total weight of the metal-core weld wire comprises between approximately 4.0 % Mn and approximately 4.5 % Mn, and between approximately 2.2 % Si and approximately 2.4 % Si.
5. The metal-core weld wire of Claim 1, the steel sheath comprises between approximately 0.35 % Mn and approximately 0.45 % Mn.

5 6. The metal-core weld wire of Claim 1, the steel sheath comprises between approximately 0.250 % Mn and approximately 0.500 % Mn, not more than approximately 0.025 % P, not more than approximately 0.015 % S, not more than approximately 0.040 % Si, not more than approximately 0.025 % Al, and not more than approximately 0.005 % N.

7. The metal-core weld wire of Claim 6, the steel sheath comprises approximately 0.370 % Mn, approximately 0.005 % P, approximately 0.009 % S, approximately 0.007 % Si, approximately 0.022 % Al, and approximately 0.003 % N.

8. The metal-core weld wire of Claim 1, the metal-core composition comprises between approximately 0.0020 % C and approximately 0.0047 % C.

9. The metal-core weld wire of Claim 1, the metal-core composition comprises between approximately 1.23 % Fe-Mn and approximately 1.56 % Fe-Mn.

10. The metal-core weld wire of Claim 1, the metal-core composition comprises between approximately 2.40 % Fe-Si and approximately 3.60% Fe-Si, between approximately 10.86 % Fe-Mn-Si and approximately 16.30 % Fe-Mn-Si, between approximately 0.44 % Fe-Ti and approximately 0.66 % Fe-Ti, and the balance Fe powder.

11. The metal-core weld wire of Claim 1, the metal-core composition is between approximately 17 % and approximately 19 % of the total weight of the

metal-core weld wire, the metal-core composition comprises between approximately 0.0025 % C and approximately 0.0046 % C.

12. The metal-core weld wire of Claim 1, the metal-core composition comprises between approximately 17 % and approximately 19 % of a total weight of the metal-core weld wire, and the metal-core composition comprises between approximately 1.46 % Fe-Mn and approximately 1.62 % Fe-Mn.

13. The metal-core weld wire of Claim 12, the metal-core composition comprises between approximately 2.85 % Fe-Si and approximately 3.15 % Fe-Si, between approximately 12.90 % Fe-Mn-Si and approximately 14.26 % Fe-Mn-Si, between approximately 0.52 % Fe-Ti and approximately 0.58 % Fe-Ti, and the balance Fe powder.

14. The metal-core weld wire of Claim 12, the steel sheath comprises between approximately 0.250 % Mn and approximately 0.500 % Mn, not more than approximately 0.025 % P, not more than approximately 0.015 % S, not more than approximately 0.040 % Si, not more than approximately 0.025 % Al, and not more than approximately 0.005 % N.

15. The metal-core weld wire of Claim 12, the total weight of the metal-core weld wire, the metal-core composition comprises between approximately 0.0025 % C and approximately 0.0046 % C.

16. The metal-core weld wire of Claim 1, the metal-core composition comprises approximately 18 % of a total weight of the metal-core weld wire, and the metal-core composition comprises approximately 3.00 % Fe-Si, approximately 13.58 % Fe-Mn-Si, approximately 0.55 % Fe-Ti, approximately 1.54 % Fe-Mn, and the balance Fe powder.

17. The metal-core weld wire of Claim 12 having a fume generation rate of approximately 0.26 gm./min. when welding with a 100 % CO<sub>2</sub> shielding gas.

18. The metal-core weld wire of Claim 12 having a fume generation rate of approximately 0.38 gm./min. when welding with a 75 % Ar and 25 % CO<sub>2</sub> shielding gas mixture.

19. The metal-core weld wire of Claim 12 having a fume generation rate of approximately 0.34 gm./min. when welding with an 82 % Ar and 18 % CO<sub>2</sub> shielding gas mixture.

20. The metal-core weld wire of Claim 12 having a fume generation rate of approximately 0.32 gm./min. when welding with an 92 % Ar and 8 % CO<sub>2</sub> shielding gas mixture.

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